

REMARKS

The Examiner objected to the disclosure as failing to include the US Application Serial number for various Applications through out the specification. The Specification has been amended as shown above to cure this defect.

The Examiner rejected Claims 1, 6, 28, 7 and 9 as being unpatentable over Claims of US patent 7,019,879 as enumerated below. Applicant traverses the rejection.

The Examiner rejected Claim 1 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 1 of US Patent 7,019,879. The Examiner suggested that the citing in Claim 1 of the current Application of a “set including row-adjacent and column-adjacent ones of said circuit elements” is not patentably distinct from the citing in Claim 1 of US Patent 7,019,879 of “a set comprising at least two of circuit elements positioned diagonally adjacent one another in array.” Applicant submits that Claim 1 of the current Application requires that the strobe signal causes the circuit elements in the set to shift data to **non-adjacent** elements outside the set in an **interleaving** pattern. Claim 1 of US Patent 7,019,879 does not require that data is shifted to non-adjacent elements outside the set in an interleaving pattern. Hence, Applicant submits that the claims are patentably distinct.

The Examiner rejected Claims 6 and 28 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 2 of US Patent 7,019,879, referring to the grouping of the circuit elements being orthogonally adjacent in each case.

Applicant submits that as noted above with respect to Claim 1, from which Claim 6 depends, Claim 6 requires that data is shifted to non-adjacent elements outside the set in question in an interleaving pattern. Claim 2 of US Patent 7,019,879 does not teach this requirement. With respect to Claim 28, Applicant submits that Claim 21, from which Claim 28 depends, also requires the shifting of data between non-adjacent ones of the light modulation elements in an interleaving pattern. As noted above with respect to Claim 6, Claim 2 of US Patent 7,019,879 does not teach this requirement. Hence, Applicant submits that Claims 6 and 28 are patentably distinct from Claim 2 of US Patent 7,019,879.

The Examiner rejected Claim 7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 3 of US 7,019,879, suggesting that the requirement that the orthogonally adjacent elements are in at least two adjacent rows is “obviously similar” to the requirement that the number of orthogonally adjacent elements is “more than two”. First, Applicant submits that Claim 7, which depends from Claim 1, requires that data is shifted to non-adjacent elements outside the set in question in an interleaving pattern. Claim 3 of US Patent 7,019,879 does not teach this requirement. Second, Applicant submits that the additional requirement that the orthogonally adjacent elements be in at least two adjacent rows is quite different from the requirement that there be more than two orthogonally adjacent elements. In the latter case, the elements could be in a single row. Hence, Applicant submits that Claims 7 is patentably distinct from Claim 3 of US Patent 7,019,879.

The Examiner rejected Claim 9 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 9 of US 7,019,879 as “both claims load data into a buffer before sending the data to the circuit elements and both depend on obviously similar claims”. Applicant submits that as noted above with respect to Claim 1, from which Claim 9 depends, Claim 9 requires that data is shifted to non-adjacent elements outside the set in question in an interleaving pattern. Claim 9 of US Patent 7,019,879 does not teach this requirement. Hence, Applicant submits that the claims are patentably distinct.

The Examiner rejected Claims 10 and 11 under 35 U.S.C. 112, second paragraph because it was unclear as which “ones” are meant. Claims 10 and 11 have been amended to cure this defect.

The Examiner rejected Claims 15-18 under 35 U.S.C. 112 because the claims referred to a spatial light modulator. Claims 15-18 have been amended to cure this defect.

The Examiner rejected Claims 19-20 under 35 U.S.C. 112, second paragraph, because the claims refer to a spatial light modulator. Claims 19-20 have been amended to cure this defect.

The Examiner rejected Claim 32 under 35 U.S.C. 112, second paragraph because it was unclear as to how data is loaded into a first section of the array in response to a probe signal derived from the strobe signal. Claim 32 has been amended to cure this defect.

The Examiner rejected Claims 1-5, 8-10, and presumably 11 under 35 U.S.C. 102(b) as being anticipated by Bagley (US 3,564,510). Claim 2 has been canceled, rendering its rejection moot. Applicant traverses the rejection of Claims 1, 3-5, and 8-11.

Applicant submits that several limitations required by Claim 1 are not taught by Bagley.

First, Claim 1 requires the shifting of data **from one set of circuit elements to another circuit elements** outside the first set. The Examiner identifies indicators 2 in Figure 6 of Bagley as the circuit elements in question and the Examiner points to column 15 lines 10-15 as teaching the shifting. Applicant submits that the cited passage discusses shifting with reference to Figure 2b, and relates to the possibility of re-routing time multiplexed data between the outputs of the set decoder 57, from one set of ROW gates 53 to another. Applicant submits that any such re-direction of data occurs in circuitry well “upstream” of the rows of indicators 2. The Examiner has not pointed to any teaching regarding the shifting of data from one set of indicators 2 to another.

Second, Claim 1 requires that the elements to which data is shifted outside the first set of elements are **non-adjacent** to that first set of elements. Even if the elements in question are taken as being the ROW gates 53 rather than the indicators 2 identified by the Examiner, there is no teaching that the shifting described in the cited passage (column 15 lines 10-15) occurs to non-adjacent elements.

Third, Claim 1 requires that the data shifting occurs **in an interleaving pattern**. The Examiner points to col. 2, line 45, regarding projected images being “interleaved” with the rows of indicators, as disclosing the interleaving required by the Claim. Applicant submits that the type of interleaving required by the claim is an interleaving of the data among data-containing circuit elements. The Examiner has not pointed to any teaching in Bagley

regarding the interleaving of data contained in the indicators between non-adjacent sets of the indicators.

Fourth, Claim 1 requires that the set of circuit elements from which data is shifted includes **row-adjacent and column-adjacent** elements. The Examiner points to the elements in Row 1 as being the row-adjacent elements and the elements in the first column (B0-R1, B0-R2 etc) as being the column-adjacent elements required. However, the only set of elements identified by the Examiner as containing data that can be shifted is a row of elements. Applicant submits that the Examiner has not pointed to any teaching of data shifting from a set that includes row-adjacent AND column-adjacent elements.

Fifth, Claim 1 requires that the data shifting occurs in response to a strobe signal on a strobe line coupled to the set of circuit elements. The Examiner points to column 15 lines 10-15 as teaching the shifting and the Examiner identifies line 119 in Figure 6 as the strobe causing such shifting from one set (Row 1) to another set (Row 10). Applicant submits that the shifting discussed in the passage cited by the Examiner is a re-routing of time multiplexed data between the outputs of the set decoder 57, from one set of ROW gates 53 to another. Applicant submits there is no teaching that the shifting identified by the Examiner is carried out in response to any signal on line 119 of Fig 6, which is simply as “a common connection” of the row of gates to the output of the decoder 122 (Column 9, lines 36-38).

Hence, Applicant submits that Bagley does not anticipate Claim 1 and the Claims dependent therefrom.

Claim 3 depends from Claim 1 and additionally requires that one strobe line provides strobe signals to elements located in one pair of adjacent rows, and that a second strobe line provides strobe signals to elements located in a second pair of adjacent rows. The Examiner identifies element 119 of Figure 6 of Bagley as both of the strobe lines required, identifying the elements labeled under BIT 0 and BIT 1 as elements in the first pair of adjacent rows, and the elements labeled under BIT 1 and ROW 2 as elements in the second pair of adjacent rows.

As best Applicant can understand, the Examiner appears to first consider the elements connected to line 119 as constituting a row of elements in the sense required by the Claim,

then decides to take the elements in a column of elements, connected to a BIT line as a row instead, and finally takes the elements in one column and one row as constituting a pair of adjacent rows. Applicant submits that none of the three interpretations of the sets of elements presented by the Examiner teaches that even one instance of element 119 being connected to a pair of adjacent rows of circuit elements, yet alone two such rows. Hence, Applicant submits that there are additional grounds for allowing Claim 3 and the Claims dependent therefrom.

With respect to Claim 8, the Examiner has not pointed to any teaching in Bagley with respect to the limitations of Claim 6 from which Claim 8 depends. Hence, the Examiner has not pointed to teachings in the reference that provide all of the limitations of Claim 8. Accordingly, there are additional grounds for allowing Claim 8.

Claim 9 depends from Claim 1 and further requires a buffer connected to an least one end of an array, to load data into the elements of that array. The Examiner points to Fig. 2a as including latches, and identifies these latches as a buffer. The Examiner points to column 6, lines 40-55 of Bagley as describing the latches, and the Examiner states that the latches of Figure 2a are connected to the end of the array through the BIT bus lines. Applicant submits that the passage cited by the Examiner relates to the possible inclusion of latches or similar elements “within the system” such that the state of each latch determines one bit of input information corresponding to a condition 40 that is eventually represented by the indicators 2. Applicant submits that neither the cited text nor Figure 2a shows the location of any latches, and hence, cannot show that the latches are connected to at least one end of an array of elements. The mere fact that something could be true is not sufficient to sustain a rejection under 35 U.S.C. 102. Hence, Applicant submits that there are additional grounds for allowing Claim 9 and the Claims dependent therefrom.

Claim 10 depends from Claim 9 and further requires that the buffer loads data into circuit elements into at least a portion of at least two rows of the array. The Examiner states that the latch mentioned in column 6, lines 40-55 of Bagley, and identified by the Examiner as the buffer in question, will load data on “the BIT lines into at least a portion of at least two of the rows”. Applicant submits that the passage cited by the Examiner, relating to Figure 2a, concerns latches and corresponding conditions 40, each of which corresponds to

elements in a particular row, such as ROW 1, or ROW 10, for example. Applicant submits that the Examiner has not pointed to any teaching that a latch loads data into elements in more than one row of the array. Hence, Applicant submits that there are additional grounds for allowing Claim 10.

The Examiner rejected Claims 21-23, 25 and 29-31 under 35 U.S.C. 102(b) as being anticipated by Grabert (7,133,022). Applicant traverses the rejection.

Claim 21 requires a sequence of operations in which one step involves the alteration of light modulation elements in response to loaded data to transfer one instance of an image onto a substrate, a second step involves the shifting of that data between non-adjacent ones of those elements, and a third step involves the alteration of the elements in response to that shifted data to transfer a second instance of the image onto the substrate. The Examiner points to column 9 lines 35-60 of Grabert, disclosing the alteration of light modulation elements in response to data shifted from one element, an inoperable proxel, to a non-adjacent “remote” proxel, as providing the required teaching.

Applicant submits that the cited passage in Grabert relates to a means of compensating for one inoperable proxel by redirecting the data that would have been projected by that proxel to another, remote proxel. The Examiner has not pointed to any teaching that the system taught by Grabert transfers more than one instance of an image onto a substrate. Hence, Applicant submits that the sequence of operations specified by the Claim, which requires two instances of the same image to be transferred, one before and one after the shifting of data between the modulation elements, is not taught by Grabert.

Claim 21 further requires that data is shifted between elements in **an interleaving pattern**. The Examiner points to column 7, lines 59-65 which mentions “interleaving” as providing this teaching. Applicant submits that the cited passage mentions interleaving as one item in a list of standard terms such as masking, reverse scanning, and gang scanning, which are well known to those skilled in the art of electronic displays. Applicant submits that in this context, the term interleaving clearly relates to the technique in which one selection of the pixels making up the image of interest, typically every other row of pixels, is displayed alternately with the display of another of the remainder of the pixels, the intervening rows.

The interleaving of the two partial images is carried out at a sufficiently high frequency for the viewer to perceive the image as a whole. Applicant submits that Claim 21 clearly relates to a very different type of interleaving, in which **data is shifted** between light modulation elements. The Examiner has not pointed to any teaching that the interleaving mentioned by Grabert requires any shifting of data.

Hence, Applicant submits that Grabert does not anticipate Claim 21 and the Claims dependent therefrom.

With respect to Claim 23, the claim requires that the data be shifted between the non-adjacent ones of the light modulation elements in response to the strobe signal. The Examiner states that the pixels must be attached to some form of strobe line, and hence, the limitation of the claim is met. Applicant submits that the data must be shifted between elements in response to the strobe signal. The Examiner has not pointed to any teaching of a signal that causes the data to be shifted between elements. In the system taught in Grabert, the data is transferred into the array of elements but is not shifted between the elements once it arrives in the array. Hence, there are additional grounds for allowing Claim 23.

Claim 29 depends from Claim 21 and further requires that data is loaded into the elements at one end of an array of rows and columns of elements. The Examiner points to Figure 5A of Grabert as showing an array of elements in rows and columns. The Examiner points to Figure 15 as showing the loading of data into the light modulation elements at one end of the array. Applicant submits that Figure 15 shows that data is loaded into a linear array of elements, Proxel 1 to Proxel N, with each proxel connected to its own individual data line. There is no teaching that the proxels shown in Figure 15 as receiving data are even part of an array of elements organized as rows and columns, let alone that they are located at one end of such an array. Hence, Applicant submits that Grabert there are additional grounds for allowing Claim 29 and the Claims dependent therefrom.

The Examiner rejected Claims 6 and 7 under 35 U.S.C. 103(a) as being unpatentable over Bagley. Applicant traverses the rejection.

In regards to Claim 6, the Examiner states that it would have been obvious as a matter of design choice to modify the system taught by Bagley by changing the orientation of the strobe line to connect to orthogonally adjacent elements in at least two groups, positioned diagonally in the array with respect to one another.

First, as noted above with respect to Claim 1 from which Claim 6 depends, Bagley does not teach the **shifting** of data from one set of **row-adjacent and column-adjacent** circuit elements to other **non-adjacent** circuit elements outside the first set in an **interleaving** pattern **in response to a strobe signal** on a strobe line coupled to the set of circuit elements. The Examiner has not provided any reasons to support the idea that modifying Bagley to provide these missing limitations would be obvious.

Second, Applicant submits that requiring the orientation of the strobe line to connect to orthogonally adjacent elements in at least two groups, positioned diagonally in the array with respect to one another is much more than a mere design choice. The specification of the current invention explains (page 22, lines 1-10) the value of this particular arrangement in reducing clock skew, so allowing a higher operational frequency, and also in limiting “the extent of damage resulting from a failure” in the strobe line.

Hence, Applicant submits that the Examiner has failed to make a *prima facie* case for obviousness with respect to Claim 6, and the Claims dependent therefrom.

Claim 7 depends from Claim 6 and further requires that the orthogonally adjacent elements are in at least two adjacent rows. The Examiner points to B0-R2 and B1-R1 in Figure 6 as such elements. Applicant submits that Figure 6 shows that these two elements are not orthogonally adjacent but diagonally adjacent, as they are in adjacent rows and adjacent columns. Hence, there are additional grounds for allowing Claim 7.

The Examiner rejected Claims 12-14, 16-17, 24 and 26-27 under 35 U.S.C. 103(a) as being unpatentable over Bagley in view of Grabert, et al (hereafter "Grabert") (7,133,022).

With regard to Claim 12, the Examiner states that Bagley discloses the limitations of Claim 9, from which Claim 12 depends but does not disclose the additional requirements relating to the buffer elements and strobe line. The Examiner looks to Grabert for the missing teachings. The Examiner maintains that it would have been obvious to modify Bagley to include the use of buffer elements loading data into portions of the array as taught by Grabert in order to allow higher refresh rates for a crisper image with less image flicker (col. 3, lines 45-60 of Grabert).

First, as noted above with respect to Claim 9, Applicant submits that Bagley does not teach either the **shifting** of data from one set of **row-adjacent and column-adjacent** circuit elements to other **non-adjacent** circuit elements outside the first set in an **interleaving** pattern **in response to a strobe signal** on a strobe line coupled to the set of circuit elements as required by Claim 1, or the additional requirement in Claim 9 of a buffer connected to at least one end of an array, to load data into the elements of that array. Grabert does not provide these missing teachings.

Second, Claim 12 additionally requires a strobe line located in a second portion of the array of elements but connected to clock a buffer element associated with a first portion of the array. The Examiner points to Figure 16 of Grabert, identifying 382 as a buffer element associated with a first portion of the array 370, and pointing to the “PIXEL CLOCK” line as the means of clocking the buffer element 382 as required. Applicant assumes the Examiner is interpreting the PIXEL CLOCK line as the strobe line required by the Claim. Applicant submits that neither Figure 16 nor the passage cited by the Examiner (column 14, lines 25-70 of Grabert) teach that this line is located **within a second portion of the array**, where the array is identified by the Examiner as emitters 382, 384, 386.

Third, Applicant submits that the motivation proposed by the Examiner to modify Bagley in view of Grabert is flawed. The passage cited by the Examiner regarding the benefits of a crisper image with less flicker relates not to any form of buffer circuitry or strobe lines but to the use of low persistence phosphors. Applicant submits that this has no relevance to the system taught by Bagley.

Hence, Applicant submits that the Examiner has failed to make a *prima facie* case for obviousness with respect to Claim 12.

Claim 13 depends from Claim 1 and further requires that the circuit elements are light modulation elements which include memory elements configured to store the data and shift the data therebetween, and also include pixel controllers configured to alter the state of respective ones of said light modulation elements in response to the data stored in respective ones of the memory elements. The Examiner looks to Bagley as teaching the limitations of the base Claim, and looks to Grabert for the missing teachings. The Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 13.

First, as noted above with respect to Claim 1, Bagley does not teach the **shifting** of data from one set of **row-adjacent and column-adjacent** circuit elements to other **non-adjacent** circuit elements outside the first set in an **interleaving** pattern **in response to a strobe signal** on a strobe line coupled to the set of circuit elements as required by Claim 1. Grabert does not provide these missing teachings.

Second, the Examiner identifies the proxels of Grabert as the light modulation elements required, identifies elements 390, 370, 372, 374 of Figure 16 and element 342 of Figure 15 as the memory elements, and identifies element 344 of Figure 15 as the pixel controllers. Applicant submits that the proxels taught by Grabert, light sources associated with modulators, are shown in Figure 16 as elements 382, 384, 386, and in Figure 15 as elements 346, 348, 350, 352. These elements are separate from and **do not include** any of the elements identified by the Examiner as memory elements and pixel controllers.

Hence, Applicant submits that the Examiner has failed to make a *prima facie* case for obviousness with respect to Claim 13 and the Claims dependent therefrom.

Claim 14 depends from Claim 13 and further requires two groups of the memory elements, the pixel controllers being controlled by the memory elements in an interleaving pattern between those two groups. The Examiner identifies elements 370 and 372 of Grabert as the two groups of memory elements and cites column 2 line 45 of Bagley as teaching the

required interleaving. Applicant submits that the interleaving mentioned in the cited passage of Bagley is the physical interleaving of projected images with associated indicator lights, not the interleaving of control signals to groups of memory elements. The Examiner has not pointed to any teaching regarding interleaving of signals between the memory elements identified in Grabert. Furthermore, the Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 14. Hence, Applicant submits that there are additional grounds for allowing Claim 14.

Claim 17 depends from Claim 1 through Claims 13 and 16, and further requires that the liquid crystal light modulation elements collectively comprise a common electrode configured to receive a common electrode signal. The Examiner points to the PIXEL CLOCK line shown in Figure 16 of Grabert as providing a common electrode signal to common electrode comprised by the light modulation elements 382, 384, 386. Applicant submits that the Examiner has not pointed to any teaching regarding the PIXEL CLOCK sending a common signal to any common electrode comprised by the elements 382, 384, 386. Furthermore, the Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 17. Hence, Applicant submits that there are additional grounds for allowing Claim 17.

Claim 18 depends on Claim 1 through Claim 13 and additionally requires that the pixel controllers comprise electromechanical devices that control micromirrors included in the light modulation elements. The Examiner points to column 4, lines 5-15 of Grabert as providing these additional teachings. Applicant submits that the cited passage teaches micro-electromechanical mirrors only in the context of the light projecting units taught by Grabert, identified by the Examiner as light modulation elements. The Examiner has not pointed to any teaching regarding electromechanical devices within the elements 344 identified by the Examiner as the pixel controllers. Furthermore, the Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 18. Hence, Applicant submits that there are additional grounds for allowing Claim 18.

Claim 19 depends from Claim 1 and further requires additional strobe lines; and a shift register electrically connected to those strobe lines to apply the strobe signals

sequentially thereto. The Examiner points to Figure 16 of Grabert as showing the additional strobe lines and identifies element 390 as the shift register electrically connected to those strobe lines. The Examiner points to Figure 10A and column 37-47 as teaching the sequential application of the strobe signals sequentially thereto. First, Applicant submits that element 390 is shown in Figure 16 as being a configuration memory, not a shift register. Second, the Examiner does not identify which of the many lines shown in Figure 16 the Examiner is identifying as strobe lines. Third, Applicant assumed the Examiner intended to point to lines 37-47 of column 11 as teaching the sequential application of strobe signals, as these are the lines related to Figure 10A. However, Applicant submits that these lines relate to details of mirror modulation and do not provide the teachings required by this Claim. Furthermore, the Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 19. Hence, Applicant submits that there are additional grounds for allowing Claim 19 and the Claims dependent therefrom.

Claim 26 depends from Claim 21 through Claims 23 and 25, and further requires that a strobe signal is applied to at least one of the set of light modulation elements which includes elements in at least a portion of at least two adjacent rows and that data is shifted between the elements in non-adjacent rows. The Examiner identifies the blue, green and red lasers of Figure 11 as three sets of light modulation elements, and points to the “three shift lines” in Figure 16 as implementing the data shift, suggesting that as there are at least three lines, “two adjacent rows could shift the data to a third row which is not adjacent to the first”. First, the Examiner has not pointed to any teaching that any of the three “sets” of lasers are present in at least two adjacent rows. Second, the three lines labeled SHIFT in Figure 16 simply convey calibration offset data determined at the time of manufacture (column 14, lines 57-62); they do not concern the shifting of data between rows of light modulation elements. Furthermore, the Examiner does not suggest any motivation to modify Bagley in view of Grabert in a way that would satisfy the additional limitations of Claim 19. Hence, Applicant submits that there are additional grounds for allowing Claim 26.

The Examiner rejected Claim 15 under U.S.C. 103(a) as being unpatentable over Grabert and Bagley as applied to Claim 13 above, and further in view of Page, et al (hereafter "Page") (US 6,078,316). Applicant traverse the rejection.

The Examiner states that the combination of Grabert and Bagley discloses the limitation of Claim 13, from which Claim 15 depends, but does not disclose the additional requirement that each of the memory elements further includes an output node electrically coupled to the respective pixel controller and to an input node of a non-adjacent one of the memory elements. The Examiner looks to Page for the missing teachings. The Examiner states that this additional limitation in Claim 15 merely amounts to the disclosure of a shift register, and that it would have been obvious to modify Grabert and Bagley to include the use of shift registers as taught by Page in order to serve as a data buffer as stated in Page (col. 5, lines 30-40) and also act as a delay circuit or to sequentially supply data.

First, as noted above with respect to Claim 13, the combination of Bagley and Grabert does not teach either the **shifting** of data from one set of **row-adjacent and column-adjacent** circuit elements to other **non-adjacent** circuit elements outside the first set in an **interleaving** pattern **in response to a strobe signal** on a strobe line coupled to the set of circuit elements as required by Claim 1, or the additional requirement in Claim 13 that the circuit elements are light modulation elements which include memory elements and pixel controllers. Page does not provide these missing teachings.

Second, Applicant submits that the disclosure of a standard shift register, whether in Page or elsewhere in the prior art, is not equivalent to disclosing the specific type of shift inherent to the extra limitations of this Claim, in which **non-adjacent** memory elements included within light modulation elements are connected together and to a pixel controller also included within a light modulation element. The Examiner has not pointed to any teaching regarding this requirement. Hence, Applicant submits that the Examiner has failed to make a *prima facie* case for obviousness with respect to Claim 15.

I hereby certify that this paper is being sent by FAX to 571-273-8300.

Respectfully Submitted,



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